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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,009	02/20/2002	Mitsuru Ucsugi	L9289.02118	4532
24257 7590 09/06/2007 STEVENS DAVIS MILLER & MOSHER, LLP 1615 L STREET, NW SUITE 850 WASHINGTON, DC 20036			EXAMINER AGHDAM, FRESHTEH N	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 09/06/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/069,009

Applicant(s)

UESUGI ET AL.

Examiner

Freshteh N. Aghdam

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 30-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 30-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 6/26/2007 have been fully considered but they are not persuasive.

Applicant's Argument: Regarding claim 30, page 2, paragraph 3, he applicant argues that the claimed invention is not taught or suggested by Yoshida "(1) a plurality of demodulators that each has a different demodulation pattern corresponding to a single and unique bit of an idealized modulation constellation, and (2) each demodulator applies its unique demodulation pattern to a received symbol to demodulate a received value for the demodulator's corresponding single and unique bit."

Examiner's Response: In response to the argument set forth above, the examiner disagrees with the applicant for two reasons (1) claim 30 recites a plurality of demodulators that each demodulates the received symbol based on a different demodulation pattern, corresponding to a bit of an idealized modulation constellation, such that each demodulator applies a demodulation pattern corresponding to different bit of the idealized constellation and the examiner was unable to find the limitation set forth above in claim 30. (2) Yoshida discloses a plurality of demodulators that each demodulates the received signal (e.g. symbol) based on a different demodulation pattern corresponding to a different bit of an idealized modulation constellation (Fig. 6, means 506-508, Col. 11, Lines 60-67; Col. 12, Lines 1-10).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 30-31, 33-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshida (US 6,452,964).

As to claim 30, Yoshida discloses an adaptive modulation receiving method/apparatus comprising a receiver that receives a transmitted signal (Fig. 6); a plurality of demodulators that each demodulates the received signal (e.g. symbol) based on a different demodulation pattern corresponding to a bit of an idealized modulation constellation (Fig. 6, means 506-508, Col. 11, Lines 60-67; Col. 12, Lines 1-10); and a plurality of detectors each corresponding to a different demodulators and each performing error detection on demodulation information provided by the corresponding demodulator to determine whether a bit represented by the demodulation information was received correctly (means 503-505 and 509), wherein the bit represented by the demodulation information of each demodulator is the bit corresponding to the demodulation pattern applied by the demodulator (means 506-508), the modulation applied to the transmitted symbol is not a higher level of modulation than that applied as the idealized modulation (because the modulation applied to the transmitted symbol is

one of the modulation that is applied as the idealized modulation), and regenerated information represented by the received symbol comprises the demodulation information produced by all of the demodulators (outputs of means 506-508 and 510-512).

As to claim 31, Yoshida discloses that each detector outputs the bit represented by the demodulation information of the corresponding demodulator as an effective bit if received correctly (means 503-505, 509, and 111; Col. 12, Lines 11-23).

As to claim 33, Yoshida discloses an adaptive modulation communication system comprising a transmission apparatus (Fig. 1A) and a receiving apparatus (Fig. 6) that communicate using a plurality of modulation levels, each modulation level corresponding to a constellation of symbols representing the set of distinct values that a particular number of data bits may express (Fig. 1B), wherein: the transmitting apparatus comprises a selector that selects one of the plurality of modulation levels to apply in a communication (Col. 3, Lines 17-24), a modulator that modulates a set of bits in accordance with the selected modulation level so as to generate a symbol corresponding to the modulation level (Fig. 1A, means 1004), and a transmitter that transmits the generated symbol to the receiving apparatus; the receiving apparatus comprises a receiver that receives a transmitted signal (Fig. 6); a plurality of demodulators that each demodulates the received signal (e.g. symbol) based on a different demodulation pattern corresponding to a bit of an idealized modulation constellation (Fig. 6, means 506-508, Col. 11, Lines 60-67; Col. 12, Lines 1-10); and a plurality of detectors each corresponding to a different demodulators and each

performing error detection on demodulation information provided by the corresponding demodulator to determine whether a bit represented by the demodulation information was received correctly (means 503-505 and 509), wherein the bit represented by the demodulation information of each demodulator is the bit corresponding to the demodulation pattern applied by the demodulator (means 506-508), the modulation applied to the transmitted symbol is not a higher level of modulation than that applied as the idealized modulation (because the modulation applied to the transmitted symbol is one of the modulation that is applied as the idealized modulation), and regenerated information represented by the received symbol comprises the demodulation information produced by all of the demodulators (outputs of means 506-508 and 510-512).

As to claim 34, Yoshida further discloses that the selector selects the modulation level using a number having an integer square root (Fig. 1B).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 32 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, and further in view of Raleigh et al (US 2003/0072382).

As to claim 32, Yoshida discloses all the subject matter claimed in claim 30, except for a repeat requester that sends a repeat request to the transmitting apparatus that transmitted the symbol when one of the plurality of detectors detects an error. Raleigh discloses a receiving method/ apparatus comprising a repeat requester that sends a repeat request to the transmitting apparatus that transmitted the symbol when at least one of the plurality of detectors detects an error (Par. 77). Therefore, it would have been obvious to one of ordinary skill in the art to send a repeat request message back to the transmitting apparatus when at least one of the plurality of detectors detects an error as taught by Raleigh in order to improve accuracy of data communications.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida and Raleigh et al, further in view of the instant application's disclosed prior art.

As to claim 42, Yoshida and Raleigh teach all the subject matter claimed in claim 41, except for the selector selects the modulation level based on channel quality estimated from the repeat request signal. The instant application's disclosed prior art teaches that the selector selects the modulation level based on channel quality estimated from the repeat request signal (Fig. 1, means 1-2, 5-6, and 11; page 4, lines 18-page 5, line10).

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, and further in view of Sugiyama et al (US 5,862,175).

As to claim 35, Yoshida discloses all the subject matter claimed in claim 33, except for the modulation level uses a number not having an integer square root. Sugiyama, in the same field of endeavor, teaches a communication system that the modulation scheme is varied among M-ary modulation schemes (n phase shift keying modulation schemes) each with a square root of the number of signal points not being an integer (Fig. 1,  $2^n$  multi-level modulation means; Col. 3, lines 5-9). Therefore, it would have been obvious to one of ordinary skill in the art to perform selectable and flexible modulation of variable order in a communication system as taught by Sugiyama in order to increase flexibility of the communication system.

Claims 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida, and further in view of Lee et al (US 6,259,744).

As to claim 36, Yoshida teaches all the subject matter claimed in claim 33, except for the modulator modulates the transmission data by arranging signal points in such a way that a difference between the number of signal points on the I-axis and Q-axis is small. Lee, in the same field of endeavor, teaches a signal space diagram wherein the number of signal points on the I-axis is the same as the number of signal points on the Q-axis (e.g. the difference between the number of points on the I-axis and Q-axis directions is minimum; Fig. 3). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Lee with Yoshida in order to minimize bit error rate in the communication system by minimizing the difference between the number of points on the I-axis and Q-axis directions (Col. 2, Lines 17-19).



As to claims 37 and 38, Yoshida teaches all the subject matter claimed in claim 33, except for using a modulation scheme in which a phase direction is identified by an axis that crosses an origin point in a signal space diagram. Lee, in the same field of endeavor, teaches using phase determination axes (Fig. 3, means 54 and 56; Col. 5, Lines 1-12 and 51-53) passing through the origin point in a signal space diagram and computing the closest distance between the symbol and the bit on the decision line (i.e. amplitude identification). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Lee with Yoshida in order to detect error probability of a bit in a symbol and improving the signal recovery process (Col. 5, Lines 7 and 8).

As to claim 39, Yoshida discloses that each detector outputs the bit represented by the demodulation information of the corresponding demodulator as an effective bit if received correctly (means 503-505, 509, and 111; Col. 12, Lines 11-23).

As to claim 40, Yoshida teach all the subject matter claimed in claim 33, except for the transmitter transmits a pilot signal (training sequence or the second bit decision line) arranged in the middle of a maximum amplitude in a signal space diagram of the modulation scheme. Lee teaches that the pilot signal (Fig. 3, decision lines 54 and 56) is arranged in the middle of a maximum amplitude in a signal space diagram of the modulation scheme (column 5, lines 1-10 and 30-32; column 6, lines 47-50). One of ordinary skill in the art would clearly recognize that transmitting pilot signal from a transmitter to a receiver is well known in the art and it is performed for performance characteristic measurements and synchronization purposes. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Lee with

Yoshida in order to measure performance characteristics of a communication system and synchronizing the transmitter with the receiver by utilizing a pilot signal in the middle of the frame that is to be transmitted from a transmitter to a receiver.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Freshteh N. Aghdam whose telephone number is 571-272-6037. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Freshteh Aghdam  
Examiner  
Art Unit 2611

August 21, 2007

  
CHIEH M. FAN  
SUPERVISORY PATENT EXAMINER